

## CLAIMS

What is claimed is:

1. A telecommunications system for providing service to a cellular device located within a radio-frequency (RF) shadow of a communication station including a transmitter and a receiver, the system comprising:

a line-of-sight (LOS) antenna for receiving a transmitter signal from the station; and  
a shadow antenna in communication with the LOS antenna and located within a line of sight of the RF shadow and for receiving a cellular signal from the cellular device;

the LOS antenna for receiving the cellular signal from the shadow antenna and transmitting the cellular signal to the station;

the shadow antenna for receiving the transmitter signal from the LOS antenna and transmitting the transmitter signal to the RF shadow.

2. The system of claim 1 further comprising an interconnection disposed between the antennas for communicating the signals between the LOS antenna and the shadow antenna.

3. The system of claim 1 further comprising an amplification section disposed between the antennas for amplifying the transmitter signal and the cellular signal.

4. The system of claim 3 wherein the amplification section includes an LOS circulator and a shadow circulator defining an LOS-to-shadow path and a shadow-to-LOS path between the antennas;

the LOS circulator for:

receiving the cellular signal from the shadow-to-LOS path;  
providing the cellular signal to the LOS antenna;  
receiving the transmitter signal from the LOS antenna; and  
providing the transmitter signal to the LOS-to-shadow path; and

the shadow circulator for:

receiving the transmitter signal from the LOS-to-shadow path;  
providing the transmitter signal to the shadow antenna;  
receiving the cellular signal from the shadow antenna; and  
providing the cellular signal to the shadow-to-LOS path.

5. The system of claim 4 wherein the amplification section further comprises a pair of amplifiers respectively positioned in the paths.

6. The system of claim 1 further comprising a plurality of shadow antennas each for receiving the transmitter signal from the LOS antenna and transmitting the transmitter signal to the RF shadow

7. The system of claim 6 further comprising a splitter disposed between the LOS antenna and each of the plurality of shadow antennas and for splitting the transmitter signal into a corresponding plurality of transmitter signals respectively communicated to the shadow antennas.

8. The system of claim 7 further comprising an amplification section disposed between the LOS antenna and the splitter for amplifying the cellular signal received by at least one of the shadow antennas and for amplifying the transmitter signal received by the LOS antenna.

9. The system of claim 8 wherein the amplification section includes an LOS circulator and a shadow circulator defining an LOS-to-shadow path and a shadow-to-LOS path between the antennas;

the LOS circulator for:

- receiving the cellular signal from the shadow-to-LOS path;
- providing the cellular signal to the LOS antenna;
- receiving the transmitter signal from the LOS antenna; and
- providing the transmitter signal to the LOS-to-shadow path; and

the shadow circulator for:

- receiving the transmitter signal from the LOS-to-shadow path;
- providing the transmitter signal to the splitter;
- receiving the cellular signal from the splitter; and
- providing the cellular signal to the shadow-to-LOS path.

10. The system of claim 7 further comprising a plurality of amplification sections respectively disposed between the shadow antenna and the splitter each for amplifying a respectively received transmitter signal and for amplifying the cellular signal received by a respective one of the shadow antennas.

11. The system of claim 10 wherein each of the amplification sections includes an LOS circulator and a shadow circulator defining an LOS-to-shadow path and a shadow-to-LOS path between the splitter and a respective one of the shadow antennas;

the LOS circulator for:

- receiving the cellular signal from the shadow-to-LOS path;
- providing the cellular signal to the splitter;
- receiving the transmitter signal from the splitter; and
- providing the transmitter signal to the LOS-to-shadow path; and

the shadow circulator for:

- receiving the transmitter signal from the LOS-to-shadow path;
- providing the transmitter signal to a respective one of the shadow antennas;
- receiving the cellular signal from a respective one of the shadow antennas; and
- providing the cellular signal to the shadow-to-LOS path.

12. A method for providing service to a cellular device located within a radio-frequency (RF) shadow of a communication station including a transmitter and a receiver, the method comprising:

- receiving a transmitter signal from the station with an antenna located in a line of sight of the station;

- transmitting the transmitter signal to the RF shadow with an antenna located in a line of sight of the RF shadow;

- receiving a cellular signal from the cellular device with an antenna located in a line of sight of the RF shadow; and

- transmitting the cellular signal to the station with the antenna located in a line of sight of the station.

**13.** The method of claim 12 wherein the antenna transmitting the transmitter signal and the antenna receiving the cellular signal is the same antenna.

**14.** The method of claim 12 further comprising:  
transmitting the transmitter signal to the RF shadow with a plurality of antennas located in a line of sight of the RF shadow.

**15.** The method of claim 14 wherein each of the plurality of antennas transmits the transmitter signal along a unique transmission axis.

**16.** The method of claim 14 further comprising:  
receiving a plurality of cellular signals with the plurality of antennas.

**17.** The method of claim 14 further comprising:  
splitting the transmitter signal prior to transmission to the RF shadow.

**18.** The method of claim 14 wherein the plurality of antennas includes antennas of different types.

**19.** The method of claim 12 further comprising:  
decoupling the transmitter signal prior to transmission to the RF shadow; and  
decoupling the cellular signal prior to transmission to the station.

**20.** The method of claim 19 further comprising:  
amplifying the decoupled transmitter signal prior to transmission to the RF shadow; and  
amplifying the decoupled cellular signal prior to transmission to the station.